Harvard Medical School

Curriculum Vitae

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Place of Birth: Jamshedpur, India

Citizenship: American

Education

1985-1988	Bachelor of Arts	Medical Science	Boston University, Boston, MA (Combined B.A./M.D. Medical Program)
1990-1994	M.D.		Boston University School of Medicine, Boston, MA (Research – Judah Folkman, MD, Advisor, Boston Children's Hospital/Harvard Medical School)

Postdoctoral Training

07/1994-06/1996	Resident	Surgery	UMDNJ – Robert Wood Johnson Medical School, New Brunswick, NJ
07/1996-2003	Research Fellow	Vascular Biology Program, Department of Surgery, P.I. Dr. Judah Folkman	Boston Children's Hospital, Harvard Medical School, Boston MA
1989-1994	Medical Student (Research)		Boston Children's Hospital, Harvard Medical School, Boston MA. Judah Folkman, M.D., Advisor

Faculty Academic Appointments

2003-2013	Instructor	Surgery	Harvard Medical School, Boston, MA
2013-2014	Instructor	Pathology	Harvard Medical School, Boston, MA
2014-	Assistant Professor of	Pathology	Harvard Medical School, Boston, MA

present	Pathology		

Appointments at Hospitals/Affiliated Institutions

2011-2013	Associate Scientific Research Staff	Vascular Biology Program	Boston Children's Hospital, Boston, MA

Committee Service

National/International Committees:

Year	Name of Committee	Role	Institution
2003	Advisory Group	Member	Entremed, Inc., Rockville, Maryland.
2005	Advisory Group	Member	Momenta Pharmaceuticals, Cambridge, Massachusetts.
2007	Advisory Group	Member	Pervasis Therapeutics, Cambridge, Massachusetts.
2009	Session Organizer	Chair	4th Medical Biotech Forum - *Molecular Oncology* - Dalian, China.
2009	Session Organizer	Co-Chair	4th Medical Biotech Forum – *Cancer Gene Therapy and Cancer Cells* – Dalian, China.
2010	Symposium Organizer	Chair	12th International Winter Eicosanoid Conference – *Eicosanoids in Cancer* – Baltimore, Maryland.
2010	Session Organizer	Co-Chair	8th Annual Congress of International Drug Discovery, Science, and Technology - *Advances in Other Existing Validated Cancer Drug Targets* - Beijing, China.
2010	Session Organizer	Co-Chair	3rd Annual World Congress of Regenerative Medicine and Stem Cells - *Hematopoietic and Cardiovascular Tissue Regeneration* - Shanghai, China.
2010	Session Organizer	Chair	3 rd Annual World Congress of Regenerative Medicine and Stem Cells – *Young Investigator Forum* - Shanghai, China.
2011	Fundraising Committee	Chair	12th International Conference on Bioactive Lipids in Cancer, Inflammation, and Related Diseases, Seattle, Washington.
2011	Session Organizer	Chair	12th International Conference on Bioactive Lipids in Cancer, Inflammation, and Related Diseases, Seattle, Washington.
2011	Scientific Advisory Committee	Member	12th International Conference on Bioactive Lipids in Cancer, Inflammation, and Related Diseases, Seattle, Washington.
2012	Session Organizer	Co-Chair	4th International Conference on Drug Discovery & Therapy. *Academic/Industrial Collaborations in Drug Discovery/Drug Delivery & Targeting*, Dubai, United Arab Emirates.
2012	Session Organizer	Chair	14th International Winter Eicosanoid Conference. *Lipid Mediators and Obesity,* Baltimore, Maryland.

2012	Session Organizer	Chair	5th Annual World Congress of Regenerative Medicine and Stem Cells – *Young Investigator Forum* - Guangzhou, China.
2013	International Advisory Board	Meeting Organizer	Drug Discovery & Therapy World Congress, Boston, Massachusetts.
2013	Track Chairman	Chair	Drug Discovery & Therapy World Congress. *Bioactive Lipids.* Boston, Massachusetts.
2013	Track Chairman	Chair	Regenerative Medicine & Stem Cells, Biopharmaceutical Summit, Frankfurt, Germany.
2013	International Advisory Board	Meeting Organizer	Biopharmaceutical Summit, Frankfurt, Germany.
2014	Meeting Organizer	Chair	15th International Winter Eicosanoid Conference. Baltimore, Maryland.
2016	Meeting Organizer	Chair	16h International Winter Eicosanoid Conference. Baltimore, Maryland.
2017	Sponsorship Committee	Member	15th International Conference on Bioactive Lipids in Cancer, Inflammation, and Related Diseases, Puerto Vallarta, Mexico
2018	Meeting Organizer	Chair	17h International Winter Eicosanoid Conference. Baltimore, Maryland.
2018-present	Education Committee	Member	Experimental Biology, American Society of Investigative Pathology, San Diego, CA
2020	Meeting Organizer	Chair	18th International Winter Eicosanoid Conference. Baltimore, Maryland.

Professional Societies

2003-	American Association of Cancer Reserach (AACR)	Member
2010-	Dana-Farber/Harvard Cancer Center	Member
2012-	American Society of Investigative Pathology (ASIP)	Member

Community Service

2009	Poster Judge	The 11th International Winter Eicosanoid Conference, Baltimore, MD.
2011	Poster Judge	The 13th International Winter Eicosanoid Conference, Baltimore, MD.
2012	Poster Judge	The 14th International Winter Eicosanoid Conference, Baltimore, MD.
2012	Junior Investigator Mentor Training Session	The 14th International Winter Eicosanoid Conference, Baltimore, MD.
2013	Poster Judge	Soma Weiss Student Research Day, Boston, MA.
2014	Poster Judge	Soma Weiss Student Research Day, Boston, MA.
2014-present	Head of Translational Seminar Series	Center for Vascular Biology Research

2014	Junior Investigator Mentor Training Session	The 15th International Winter Eicosanoid Conference, Baltimore, MD.
2014-2016	Lecturer-Stonehill College	Cancer Biology
2015-present	Lecturer – Boston College	Cancer Biology
2016	Junior Investigator Mentor Training Session	The 16th International Winter Eicosanoid Conference, Baltimore, MD.
2016-present	Lecturer- Harvard Medical School (HST 527)	Blood Vessels and Endothelial Cells Phenotypes in Health and Diseases
2017-present	Lecturer	Grant Review and Support Program (GRASP)
2018	Junior Investigator Mentor Training Session	The 17th International Winter Eicosanoid Conference, Baltimore, MD.

Grant Review Activities

2006	Children's Brain Tumor Foundation, New York	Ad hoc reviewer
2009	National Center for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs), United Kingdom	Ad hoc reviewer
2017	Target Ovarian Cancer	Ad hoc reviewer

Editorial Activities

Ad hoc Reviewer

Carcinogenesis
Neoplasia
Cancer Research
BioMed Central
PPAR Research
Toxicologic Pathology
Angiogenesis
Proceeding of the National Academy of Sciences
Clinical Cancer Research
British Journal of Pharmacology
Journal of Biological Chemistry
Journal of Experimental and Clinical Research
Diabetes Metabolic Syndrome and Obesity: Targets and Therapy
PNAS
The Journal of Clinical Investigation
Nature Reviews Cancer

Other Editorial Roles

2008-present	Associate Editor	PPAR Research
2008	Guest Editor	PPAR Research
2010	Guest Editor	PPAR Research
2011	Guest Editor	Recent Patents on Inflammation and Allergy Drug Discovery
2010-present	Editorial Advisory Board Member	Journal of Cardiology
2011-present	Editorial Advisory Board Member	Journal of Autacoids
2011-present	Editorial Advisory Board Member	Recent Patents on Inflammation and Allergy Drug Discovery
2011-2015	Editor-in-Chief	Current Angiogenesis
2011-2013	Editor-in-Chief	Bloactive Lipids in Cancer

Honors and Prizes

1985-1994	Accelerated B.A./M.D. Medical Program	Boston University, Boston, MA	Academic achievement
2003-2007	NIH-Pediatric Loan Repayment Program	NIH	
2009	NIEHS Travel Award	NIH - 11th International Winter Eicosanoid Conference	
2009	Highest Rated Abstract	11th International Winter Eicosanoid Conference	
2012	One of the top 2% of publications in biology and medicine	Voted by Faculty of 1000	
2012	Top 2 downloaded articles for 2012 to present	Prostaglandins and other Lipid Mediators	
2013	Invited Plenary Lecture	Experimental Biology	
2015	Cotran Early-Investigator Career Award	American Society of Investigative Pathology	
2015	Tucker Collins Memorial Lectureship	Harvard Medical School	
2015	Visiting Professor	Khon Kaen University, Thailand	
2015	Young Investigator Award 14th International Conference on Bioactive Lipids in Cancer, Inflammation, and Related Diseases	Budapest, Hungary	
2015	A.L. Bortree Lecture	Penn State University	
2015	Discovery Lecture Series	Arizona State University (Biodesign Institute)	
2019	Visiting Professor .	Khon Kaen University, Thailand	

Report of Funded and Unfunded Projects

Funding Information

Past

1998-2002 Advanced Training in Surgical Oncology
NIH T32 CA09535
Co-Investigator
The major goal of the study is to train surgical residents in basic laboratory research techniques.

1998-2002 Research on Mechanisms of Switching to the Angiogenic Phenotype
EntreMed Inc
Co-Investigator
The major goals are to discover and detect novel angiogenesis inhibitors and to carry out the pre-clinical studies in animals that would be necessary to translate these drugs through further outside pharmaceutical development and then to clinical trials.

2002-2010 PPARs and Evaluation of Anti-Angiogenic Factors
Dana-Farber Cancer Insitute/Pediatric Brain Tumor Fund
Co-Investigator
The goal of this project was to identify pathways that regulate neovascularization in tumors and develop preclinical models to test pharmacological inhibitors of these pathways.

Completed Research Support

Control of Cancer and Metastasis by Endothelial-derived Epoxyeicosatrienoic Acids

2010-2015 NIH RO1 CA148633/National Cancer Institute
Principal Investigator
The goal of this project is to elucidate the mechanisms by which EETs stimulate tumor growth. Aim 1 will determine whether endogenous tumor-promoting EETs are derived from the endothelium, tumor cells or macrophages in the stroma. The drastic increase of number, size and spread of distant metastases, triggered by high EET levels, that we observed is unprecedented. Therefore, Aim 2 will determine whether endothelial-derived EETs facilitate dissemination at the site of the primary tumor (invasion, migration), or at the metastatic site (homing, colonization, dormancy escape). Aim 3 will test if EETs can serve as a pharmacological target for cancer therapy by determining if small molecule

antagonists of EETs inhibit tumor growth, and will begin to explore their mechanism of action.
Total Direct Cost: $161,020.

2012-2016 Controlling Cancer with Aspirin-triggered Stimulation of Resolution
NIH RO1 CA170549/National Cancer Institute
Principal Investigator
The goal of this project is to determine whether the anti-cancer activity of resolvins can be harnessed to eradicate cancer by an entirely novel approach which manipulates endogenous pro-resolving mediators. Aim 1 will establish in animal models that AT-RvDs have broad anti-cancer activity and elucidate the cellular mechanisms of action that regulate the inflammation-clearing effect of resolvins. This will set the foundation for Aim 2 which is to determine whether aspirin's anti-cancer activity is mediated by AT-RvD1. To abrogate resolvin receptor activity we will use genetically engineered mice that lack the RvD1 receptor ALX/FPR-2 and a pharmacological antagonist of its receptor (ALX/FPR-2). These studies lay the groundwork to optimize the resolvin pathway to inhibit or prevent cancer in preclinical studies for translation to humans. Thus in Aim 3 we will compare the toxicity profiles of resolvins to aspirin (i.e. in gastric bleeding and aspirin-induced mucosal injury). To determine if resolvins can replace aspirin in chemoprevention experiments, we will recapitulate the human experience with aspirin using the murine model of ApcMin/+ colon carcinogenesis. This pre-clinical characterization will establish a new direction in cancer research and guide us in determining the optimal way to use resolvins in cancer trials in humans.
Total Direct Cost: $143,128.

2015-2017 Innovation Grant (co-PI)
Alex's Lemonade Stand Foundation
Regulation of Tumor Debris Mediated Inflammation as a Therapeutic Modality in Medulloblastoma
The overall goal of this project is to study control of tumor cell debris mediated inflammation through resolvins and protectins, which represents a novel modality in medulloblastoma treatment.
Total Direct Cost: $120,000.

2018-2019 Emory University Medical School (PI)
Cancer therapy may inherently be a doubled-edged sword as iatrogenic procedures such as surgery (e.g. tumor resection and laparotomy), anesthesia, chemotherapy, and biopsy may create a wound/injury response in the body to stimulate tumor growth, pre-existing micro-metastasis, and dormancy escape via tumor-promoting inflammation and loss of tumor-specific immunity. We will study the role of cycloygenase (COX-1) inhibition and/or stimulating the resolution of inflammation to prevent tumor recurrence and tumor dormancy escape following therapy-induced tumor growth models. Total Direct Cost: $80,000.

Ongoing Research Support

2012-present
Research on Mechanisms of Anti-angiogenic activity of NXT-0001 Panigrahy (PI)
Tempest Therapeutics
The goal of this project was to conduct pre-clinical studies to evaluate the anti-angiogenic activity of NXT-0001 and its efficacy in validated spontaneous metastasis and primary tumor models. To explore the mechanism of the anti-cancer activity of NXT-0001, immunohistochemistry and histology were performed on NXT-0001treated tumors versus control tumors.
Total Direct Cost: $200,000.

2018-present
Ionova Bio Ltd. Panigrahy (PI) 4/01/2018-3/31/2021
Research on Mechanisms of Anti-tumor activity of EP receptor antagonists

The goal of this project is to conduct pre-clinical studies to evaluate the anti-tumorigenic activity of EP receptor antagonists and its efficacy in primary tumor models. To explore the mechanism of the anti-cancer activity of EP receptor antagonists, immunohistochemistry, flow cytometry and histology will be performed on EP receptor antagonist-treated tumors versus control tumors. Total Direct Cost: $212,000.

2018-present
Boston Children's Hospital/Dana Farber Cancer
Center Credit Union Kids at Heart Fund Panigrahy (PI)
New Domains in Pediatric Brain Cancer Research
Total Direct Cost: $405,000.
These studies focus on the role of resolvins and protectins in standard and debris-stimulated models of pediatric and adult cancers. Of particular interest are common CNS tumors such as medulloblastomas and gliomas including diffuse intrinsic pontine glioma (DIPG). We are evaluating which cell type in the brain regulates this process (e.g. is it the same cell type outside the brain) and testing new resolvin and protectin lipid mediators to see if targeting this pathway can effectively reduce the stimulatory signal that tumor cells receive with therapy.

2019-present
CJ Buckley Brain Cancer Research Fund Panigrahy (PI)
Inflammation Resolution in Pediatric Brain Cancer Research
Total Direct Cost: $200,000.
Brain Cancer is the leading cause of cancer related-deaths in children. To stimulate inflammation resolution, we are studying the therapeutic enhance of resolution via protectins and resolvins as a new modality to complement current brain cancer treatments that inevitably generate tumor cell debris.

2020-present
NIH/NCI SBIR Henderson (PI)
Bladder cancer chemotherapy potentiation with arachidonic acid modulation

We will develop a dual COX2/sEH inhibitor (PTUPB) as a new class of orally bioavailable compounds with anti-inflammatory and anti-angiogenic properties that have single agent activity, but is also compatible with many chemotherapy regimens in bladder cancer. The novel concurrent inhibition of cyclooxygenase (COX-2) and soluble epoxide hydrolase (sEH) is expected to have very low toxicity, which differentiates the molecule from compounds in clinical trials that are only specific to one of these targets. The aims of the follow-up Phase II award will be to advance PTUPB towards an IND approval

Role: Consortium PI

Report of Local Teaching and Training

Laboratory and Other Research Supervisory and Training Responsibilities

2002-2005	Supervision of research assistant Andrea LaForme	Daily mentorship for 3 years
2005-2010	Supervision of research assistant Deviney M. Chaponis	Daily mentorship for 5 years
2009-2010	Hau Le, MD, University of Toronto	Weekly discussions for 1 year
2009-2013	Supervision of Harvard Medical School student Brian Kalish, MD, Boston Children's Hospital	Mentorship for 4 years
2010-2012	Supervision of research assistant Emily R. Greene	Daily mentorship for 2 years
2010-2012	Kimberly Ferguson, BS, Student, Goethe University Medical School	Monthly discussions for 2 years
2010-2012	Ayala Luria, PhD, University of California, Davis	Monthly discussions for 2 years
2012-2014	Supervision of research assistant Dayna K. Mudge	Daily mentorship for 2 years
2013-2016	Supervision of post-doctoral fellow Yael Gus-Brautbar	Daily mentorship for 3 years
2012-2015	Supervision of research assistant Jessica Casper	Daily mentorship for 3 years
2013-2015	Supervision of research assistant Megan Sulciner	Daily mentorship for 2 years
2014-2016	Supervision of research assistant Kristen Lehner	Daily mentorship for 2 years
2014-2017	Supervision of research assistant Chantal Barksdale	Daily mentorship for 3 years
2014-2017	Supervision of research assistant Molly Gilligan	Daily mentorship for 3 years
2015-2017	Supervision of research assistant Donna Vatnick	Daily mentorship for 2 years
2016-2018	Supervision of research assistant Julia Piwowarski	Daily mentorship for 2 years
2016-2018	Supervision of research assistant Jaimie Chang	Daily mentorship to present
2017-2019	Supervision of post-doctoral fellow Allison Gartung	Daily mentorship to present
2016-2018	Supervision of research assistant Djanira Fernandes	Daily mentorship to present
2016-2017	Supervision of research assistant Jing Ting Yuan	Daily mentorship to present
2018	Supervision of high school student Dasha Komarnitsky	Daily mentorship for summer
2018	Supervision of college student Lucius Xuan	Daily mentorship for summer
2018	Supervision of college student Nicholas Kieran	Daily mentorship for summer
2019	Supervision of college student Kelsey	Daily mentorship for summer

	Kendzulak	
2019	Supervision of college student Maggie Hallisey	Daily mentorship for summer
2019-present	Supervision of high school student Kieran Dunn	Daily mentorship for summer
2018-present	Supervision of post-doctoral fellow Haixia Yang	. Daily mentorship to present
2019-present	Supervision of post-doctoral fellow Jianjun Deng	Daily mentorship to present
2018-2020	Supervision of research assistant Anna Fishbein	Daily mentorship for 2 years
2018-2020	Supervision of research assistant Victoria Hallisey	Daily mentorship for 2 years
2020-present	Supervision of research assistant Victoria Haak	Daily mentorship to present

Trainee Awards (n=49; 2011 to present)

2011 Prostaglandins and Other Lipid Mediators Young Investigator Award 13th International Winter Eicosanoid Conference; Emily Greene. Baltimore, MD. March 13-16.

2013 Judah Folkman Research Day Award. 14th Annual Judah Folkman Research Day; Dayna Mudge. Boston, MA. May 15.

2014 Best Abstract Award. 9th Annual Center for Vascular Biology Research Retreat. Jessica Casper.

2014 Women in Cancer Research Scholar Award. AACR Annual Meeting. Megan Sulciner. San Diego, CA. April 5-9.

2014 Prostaglandins and Other Lipid Mediators Young Investigator Award 15th International Winter Eicosanoid Conference. Dayna Mudge. Baltimore, MD. March 9-12.

2014 NIEHS Travel Award – The 15th International Winter Eicosanoid Conference. Yael-Gus Brautbar)

2014 Best Abstract Award - Boston University Henry M. Goldman School of Dental Medicine and Dana Farber's Head & Neck Cancer Symposium; Megan Sulciner; Boston, MA. April 28.

2014 Best Abstract/Poster Award – Harvard Pathology Retreat. Yael-Gus Brautbar

2014 Best Abstract Award. 10th Annual Center for Vascular Biology Research Retreat. Yael Gus-Brautbar.

2014 Best Data Club Presentation. 10th Annual Center for Vascular Biology Research Retreat. Jessica Casper.

2014 Undergraduate Best Poster Prize. Chantal Barksdale. Chestnut Hill, MA. December 11.

2015 Best Abstract Award - Boston University Henry M. Goldman School of Dental Medicine and Dana Farber's Head & Neck Cancer Symposium; Molly Gilligan. Boston, MA. September 21.

2015 Cayman Chemical Travel Award. Chantal Barksdale. Budapest, Hungary. July 12-15.

2015 Cayman Chemical Travel Award - 14th International Conference on Bioactive Lipids in Cancer, Inflammation and Related Diseases; Kristen Lehner. Budapest, Hungary. July 12-15.

2015 Scholar of the College - Awarded at Boston College commencement; Chantal Barksdale; Chestnut Hill, MA. May 15.

2015 Hans-Mongo-ASIP Trainee Travel Award for Excellence in Neoplasia Research – Experimental Biology; Kristen Lehner; Boston, MA. March 31.

2015 American Society for Investigative Pathology, Pathobiology for Investigators, Students, and Academicians (PISA) Trainee Travel Award. Kristen Lehner. Baltimore, MD. October 8-10.

2015 American Society for Investigative Pathology, Pathobiology for Investigators, Students, and Academicians (PISA) Trainee Travel Award; Molly Gilligan. Baltimore, MD. October 8-10.

2015 Outstanding Achievement in Beth Israel Deaconess Medical Center Research Assistant Learning Initiative (RALI) Mini Grand Rounds Award of Recognition. Kristen Lehner. Boston, MA. May 28.

2015 Outstanding Achievement in Beth Israel Deaconess Medical Center Research Assistant Learning Initiative (RALI) Mini Grand Rounds Award of Recognition. Molly Gilligan. Boston, MA. November 17.

2016 Best Poster Award - 16th International Winter Eicosanoid Conference. Molly Gilligan; Baltimore, MD. March 13-16.

2016 Prostaglandins and Other Lipid Mediators Young Investigator Award 16th International Winter Eicosanoid Conference; Yael Gus-Brautbar. Baltimore, MD. March 13-16.

2016 Experimental Biology, ASIP Trainee Award Award Winner. Donna Vatnick; San Diego, CA. April 2-6.

2016 Outstanding Achievement in Beth Israel Deaconess Medical Center Research Assistant Learning Initiative (RALI) Mini Grand Rounds Award of Recognition; Chantal Barksdale; Boston, MA.

2016 Alex Lemonade Stand Foundation POST medical student award; "Control of Medulloblastoma through the Regulation of Tumor Debris"; (PI: Megan Sulciner). Boston, MA. June to August.

2016 American Brain Tumor Association Medical Student Fellowship Award; "Control of Medulloblastoma through the Regulation of Tumor Debris"; (PI: Megan Sulciner). Boston, MA. June to August.

2016 Center for Vascular Biology Research Annual Retreat – Best Data Meeting/Journal Club. Molly Gilligan. September 19.

2017 Hans-Mongo-ASIP Trainee Travel Award for Excellence in Neoplasia Research – Experimental Biology. Jaimie Chang; Chicago, IL. April 22-26.

2017 Boston University Medical School - Master of Arts in Medical Science Program (MAMS) Djanira Fernandes, Best Research Presentation. April 12.

2017 Harvard Pathology Retreat – Jaimie Chang, Best Poster Award. May 12.

2017 Cayman Chemical Travel Award - Jaimie Chang. 15th International Conference on Bioactive Lipids

in Cancer, Inflammation and Related Diseases; Puerta Vallarta, Mexico. October 22-25.

2017 Cayman Chemical Travel Award – Allison Gartung. 15th International Conference on Bioactive Lipids in Cancer, Inflammation and Related Diseases; Puerta Vallarta, Mexico. October 22-25.

2017 POLM Young Investigator Award – Karolina Serhan. 15th International Conference on Bioactive Lipids in Cancer, Inflammation and Related Diseases; Puerta Vallarta, Mexico. October 22-25.

2018 NIH-NIEHS Travel Award – The 17th International Winter Eicosanoid Conference. Allison Gartung; Baltimore, MD

2018 Center for Vascular Biology Research Annual Retreat- Best Data meeting. Allison Gartung; Boston, MA.

2018 Experimental Biology ASIP Trainee Travel Award, Allison Gartung, San Diego, CA.

2019 HCS/ASIP Trainee Travel Award; Experimental Biology; Allison Gartung (Orlando, FL)

2019 HCS Vector Laboratories Young Investigator Award; Experimental Biology Allison Gartung (Orlando, FL)

2019 HCS Trainee Travel Award; Experimental Biology Victoria Hallisey (Orlando, FL)

2019 Best Poster Award; Harvard Medical School Pathology Retreat Allison Gartung (Boston, MA)
2019 Santosh Nigam Young Investigators Award; 16th International Bioactive Lipids. Anna Fishbein – (St. Petersburg, FL)

2019 Caymen Chemical Trainee Travel Award; 16th International Bioactive Lipids. Victoria Hallisey (St. Petersberg, FL)

2019 Cayman Chemical Travel Grant; 16th International Bioactive Lipids. Anna Fishbein (St. Petersburg, FL)

2019 Anna Fishbein – Bioteche “Go Anywhere” Travel Grant; 16th International Bioactive Lipids (St. Petersburg, FL)

2020 POLM Young Investigator Award; 18th International Winter Eicosanoid Conference. Victoria Hallisey (Baltimore, MD)

2020 NIH-NIEHS Travel Award; 18th International Winter Eicosanoid Conference. Anna Fishbein (Baltimore, MD)

2020 NIH-NIEHS Travel Award; 18th International Winter Eicosanoid Conference. Sanne Verheul - (Baltimore, MD)

2020 NIH-NIEHS Travel Award; 18th International Winter Eicosanoid Conference. Jianjun Deng - (Baltimore, MD)

2020 ASIP Trainee Travel Award; Experimental Biology. Anna Fishbein (San Diego, CA)

Local Invited Presentations

Harvard Medical School and Boston Children's Hospital, Boston MA

2002 *The Role of PPARγ in Angiogenesis and Tumor Growth*
Invited Speaker, Vascular Biology Program Seminar Series
Departement of Surgery, Boston Children's Hospital, Boston, MA.

2004 *The Role of Host PPARα in Angiogenesis and Tumor Growth*
Invited Speaker, Vascular Biology Program Seminar Series
Departement of Surgery, Boston Children's Hospital, Boston, MA.

2006 *The Role of PPARs in Tumor Angiogenesis*
Invited Speaker, Department of Surgical Research 24th Annual Retreat
American Academy of Arts and Sciences, Cambridge, MA.

2009 *Endothelial Epoxyeicosatrienoic Acids Control Angiogenic Disease*
Invited Speaker, Vascular Biology Program Seminar Series
Boston Children's Hospital, Boston, MA. October 7, 2009.

2010 *Epoxyeicosatrienoic Acids Control Angiogenesis-dependent Regeneration, Cancer and Metastasis*
Invited Speaker, Angiogenesis, Invasion, and Metastasis Program
Harvard Medical School, Boston, MA. April 6, 2010,

2010 *Epoxyeicosatrienoic Acids Stimulates Cancer and Multi-organ Metastasis*
Invited Speaker, Pediatric Hematology/Oncology Retreat
Dana Farber Cancer Institute, Endicott House, Cambridge, MA. October 7, 2010.

2010 *Epoxy-Eicosanoids: The Missing Link Between Obesity, Cancer, and Nutrition*
Invited Speaker, 28th Annual Vascular Biology Retreat
Boston Children's Hospital, Cambridge, MA. October 29, 2010.

2010 *Metastasis, Angiogenesis, and Beyond*
Panelist, 28th Annual Vascular Biology Retreat
Boston Children's Hospital, Cambridge, MA. October 29, 2010.

2011 *The Role of Epoxyeicosatrienoic Acids in Cancer Metastasis and Regeneration*
Invited Speaker, Schepens Eye Institute, Harvard Medical School, Boston, MA. January 11, 2011.

2011 *The Role of Epoxyeicosatrienoic Acids in Cancer Metastasis and Regeneration: The Folkman Legacy Revisited*
Invited Speaker, Vascular Biology Seminar Series
Harvard Medical School, Boston, MA. March 3, 2011.

2011 *Aspirin: New tricks for an old drug*
Invited Speaker, 29th Annual Vascular Biology Retreat
Boston Children's Hospital, Cambridge, MA. November 9, 2011.

2012 *The Role of Epoxyeicosatrienoic Acids in Cancer Metastasis and Regeneration*
Invited Speaker, Department of Pathology
Beth Israel Deaconess Medical Center, Boston, MA. June 27, 2012.

2014 *Cancer Progression:Failure to Resolve?*
Invited Speaker, Beth Israel Deaconess Pathology Ground Rounds

2016-present *"Tumor angiogenesis"* – HST 527 "Blood Vessels and Endothelial Cells Phenotypes in Health and Diseases- Harvard Medical School

2017 Omega-3 polyunsaturated fatty-acid derived pro-resolving mediators in cancer (CRI Faculty Seminar series; Beth Israel Deaconess Medical Center)

2018 CRI Faculty Seminar series- Beth Israel Deaconess Medical Center

Report of Regional, National and International Invited Teaching and Presentations

Those presentations below sponsored by outside entities are so noted and the sponsors are identified.

Invited Presentations and Courses

Regional

1994	*The Porto-Renal Shunt: Surgical Option for Budd-Chiari Syndrome* Presenter, World International Congress of the Hepato-Pancreatico-Biliary Association Boston, MA.
2005	*Tumor Modeling in Mice for the Evaluation of Anticancer Activity* Invited Speaker (Momenta Pharmaceuticals) Cambridge, MA.
2007	*Pre-Clinical Models for Testing Anti-cancer Drugs* Invited Speaker, Pervasis Therapeutics, Cambridge, MA.
2008	*Targeting the Tumor Stroma through PPARs* Invited Speaker, 10th Annual Boston Angiogenesis Meeting, Boston, MA. November 7, 2008.
2010	*Epoxyeicosatrienoic Acids Stimulate Cancer and Multi-organ Metastasis* Invited Speaker, Society of Pediatric Radiology, Boston, MA. April 17, 2010.
2010	*Control of Angiogenesis-mediated Regeneration, Cancer, and Metastasis by Epoxyeicosatrienoic Acids* Invited Speaker, Center of Cancer Systems Biology Caritas St. Elizabeth's Medical Center, Tufts University School of Medicine, Boston, MA. November 9, 2010.
2010-present	*Tumor Angiogenesis: From Bench to Bedside* Guest Lecturer, Biology of Cancer Course, Stonehill College, Easton, MA.
2010-present	*The Life of Dr. Judah Folkman* Guest Lecturer, Biology of Cancer Course, Stonehill College, Easton, MA.
2011	*The Role of Epoxyeicosatrienoic Acids in Cancer Metastasis and Regeneration* Invited Speaker, Boston University Medical School, Boston, MA. April 14, 2011.
2013-present	*The Life of Dr. Judah Folkman* Guest Lecturer, Cancer Biology, Boston College, Chestnut Hill, MA.
2013-present	*Cancer Progression: Resolution as the Solution*, Guest Lecturer, Cancer Biology, Boston College, Chestnut Hill, MA.
2013	*The Role of Epoxyeicosatrienoic Acids in Cancer Metastasis and Regeneration* Invited Speaker, Experimental Biology, Boston, MA.
2013	*Epoxy-eicosanoids Stimulate Multi-organ Metastasis and Tumor Dormancy Escape* Invited Speaker, Drug Discovery & Therapy World Congress, Boston, MA.
2017	*"Diversifying your Funding"* - Grant Review and Support Program (GRASP), Cambridge,MA
2017	*"Making the transition from K award to Research Independence"* - Grant Review and
2017	Support Program (GRASP), Cambridge, MA
2018	Invited Speaker, University of Massachusetts-Amherst (Molecular and Cellular Biology Program)
2020	Harvard Resolution of Inflammation Symposium, Boston, MA

National

1991	*Sucralfate: A Potentail Therapeutic Agent for Treating Corneal Ulcers*

Invited Speaker, Eastern Student Research Forum, Miami, FL.

1991 *Angioinhibin I: Novel Inhibitor of Angiogenesis and Tumor Growth*
Invited Speaker, 32nd Annual National Student Research Forum, Galveston, TX.

1994 *Modulation of Intraocular Pressure by Aldosterone and Spironolactone*
Invited Speaker, The Association for Research in Vision and Ophthalmology, Sarasota, FL.

1998 *Human Ovarian Cancer Produces an Inhibitor of Angiogenesis and Tumor Growth*
Invited Speaker, The Society of University Surgeons Residents Program, Milwaukee, WI.

1998 *Anti-angiogenic Therapy of Orthotopic Human Prostate Cancer in Mice Guided by Prostatic-specific Antigen*
Invited Speaker, American College of Surgeons 84th Annual Clinical Congress, Orlando, FL.

1999 *Thalidomide for the Treatment of Experimental Hemangioendothelioma*
Invited Speaker, American College of Surgeons 85th Annual Clinical Congress, San Francisco, CA.

2003 *Inhibition of Angiogenesis and Tumor Growth by PPARα Ligands*
Invited Speaker, Entremed, Inc., Rockville, MD.

2004 *Anti-angiogenic and Antitumor Activities of PPARα Ligands*
Invited Speaker, 95th Annual Meeting of the American Association of Cancer Research, Orlando, FL.

2007 *Anti-tumor effects of PPARα Agonist Lipid Lowering Drugs Mediated through the Tumor Microenvironment*
Presenter, In the Forefront of Basic and Translational Cancer Research 7th AACR-JCA Joint International Conference, Waikoloa, HI.

2007 *Targeting the Tumor Stroma with PPARα Agonists*
Invited Speaker, Bear Necessities Pediatric Cancer Foundation, Chicago, IL.

2008 *Targeting Inflammation in Tumors Through PPARs*
Invited Speaker, 10th Annual Winter Eicosanoid Conference, Baltimore, MD.

2009 *Endothelial-derived EETs Promote Angiogenesis, Primary Tumor Growth, and Metastasis in Transgenic Mice*
Invited Speaker, 11th Annual Winter Eicosanoid Conference, Baltimore, MD.

2010 *Epoxyeicosatrienoic Acids Control Angiogenesis-dependent Regeneration, Cancer, and Metastasis*
Invited Speaker, National Institute of Environmental Health Science, National Institute of Health, Triangle Park, NC.

2010 *Epoxyeicosatrienoic Acids Control Angiogenesis-dependent Regeneration, Cancer, and Metastasis*
Invited Speaker, Clinical Pharmacology Grand Rounds, Vanderbilt University, Nashville, TN.

2011 *The Role of Epoxyeicosatrienoic Acids in Cancer Metastasis and Regeneration*
Invited Speaker, Department of Pharmacology, New York Medical College, Valhalla, NY.

2011 *Cancer Progression: the Failure to Resolve?*
Invited Speaker, 12th International Conference on Bioactive Lipids in Cancer, Inflammation, and Related Diseases, Seattle, WA.

2012 *The Role of Epoxyeicosatrienoic Acids in Cancer Metastasis and Regeneration*
Invited Speaker, Cancer Biology Research Seminar, University of California Davis Cancer Center, Davis, CA.

2012 *The Role of Epoxyeicosatrienoic Acids in Cancer Metastasis and Regeneration*
Invited Speaker, UC Davis Biotechnology Program, Davis, CA.

2012 *The Role of Epoxyeicosatrienoic Acids in Cancer Metastasis and Regeneration*
Invited Speaker, Inception Pharmaceuticals, San Diego, CA.

2012 *The Role of Epoxyeicosatrienoic Acids in Cancer and Metastasis*
Invited Speaker, 14th Annual Winter Eicosanoid Conference, Baltimore, MD.

2012 *The Role of Epoxyeicosatrienoic Acids in Cancer Metastasis and Regeneration*

Invited Speaker, Lung Biology Research Seminar Series, University of Rochester School of Medicine and Dentistry, Rochester, NY.

2012 *The Role of Epoxyeicosatrienoic Acids in Cancer Metastasis and Regeneration*
Invited Speaker, Department of Pathology Seminar Series, Wayne State University School of Medicine, Detroit, MI.

2012 *The Role of Epoxyeicosatrienoic Acids in Cancer Metastasis and Regeneration*.
Invited Speaker, Department of Physiology. Georgia Health Sciences University, Augusta, GA.

2013 *The Role of Epoxyeicosatrienoic Acids in Cancer Metastasis and Regeneration*.
Invited Speaker, Clinical Research Divison, Fred Hutchinson Cancer Center, Seattle, WA

2013 Invited Speaker, *Stimulation of inflammation resolution by resolvins inhibits tumor growth*. 13th International Conference on Bioactive Lipids in Cancer, Inflammation, and Related Diseases, San Juan, PR.

2013 Invited Speaker, *The Role of NXT in Cancer*, Inception Pharmaceuticals, San Diego, CA

2014 Invited Speaker, *Regulation of Cancer by Cytochrome P450-derived Eicosanoids,* 14th Annual Winter Eicosanoid Conference, Baltimore, MD.

2014 Invited Speaker, *Resolvins & Cancers*, New York Academy of Science Symposium - Pharmacologic Resolution of Inflammation as a Novel Therapeutic Approach, New York, NY

2014 Invited Speaker, *Suppression of Cell Debris-Stimulated Tumor Growth By Resolvin Mediated Clearance*, Department of Pathology, Wayne State University, Detroit, MI

2015 Invited Speaker, Lipids@Wayne Symposium, Wayne State University, Detroit, MI

2015 Invited Speaker, BIDMC – JAX Immunology Special Interest Group Workshop

2015 Invited Speaker, *Cancer Progression:Failure to Resolve?;* The Cotran Lecture; Experimental Biology, Boston, MA

2015 Invited Speaker, Inception Sciences, San Diego, CA

2015 Invited Speaker, Penn State Bortree Lecture Series Invitation, University Park, PA

2015 Invited Speaker, Prostate Cancer Foundation Scientific Retreat, Washington DC

2015 Invited Speaker, Biodesign Discovery Lecture Series, The Biodesign Institute at Arizona State University, Tempe, AZ

2016 Invited Speaker, Experimental Biology, San Diego, CA

2016 Invited Speaker, Medical College of Wisconsin, San Diego, CA

2016 Invited Speaker, UCLA Jonsson Comprehensive Cancer Center “Leaders in the Field” seminar, Los Angeles, CA

2017 Invited Speaker, Wright State University, Dayton, OH

2018 Invited Speaker, American Society for Pharmacology & Experimental Therapeutics, San Diego, CA

2018 Invited Speaker, New York Academy of Sciences, New York City, NY

2019 Invited Speaker, Bioactive Lipids in Cancer, Inflammation, and Related Diseases, St. Petersberg, FL

2019 Invited Speaker, Masonric Cancer Center, University of Minnesota, Minneapolis, MN

International

2009 *Endothelial-derived EETs regulate Tumor Angiogenesis and Metastasis*
Invited Speaker, 4th Medical Biotech Forum, Dalian, China.

2009 *Control of Cancer and Metastasis by Endothelial-derived Epoxyeicosatrienoic Acids*
Invited Speaker, 11th International Conference on Bioactive Lipids in Cancer,

Inflammation, and Related Diseases, Cancun, Mexico.

2010 *Epoxyeicosatrienoic Acids Control Angiogenesis-dependent Regeneration, Cancer, and Metastasis*
Invited Speaker, Graduate School Lecture Series, Goethe University, Videoconference to Heidelberg University and Mannheim University, Frankfurt, Germany.

2010 *Epoxyeicosatrienoic Acids Control Angiogenesis-dependent Regeneration, Cancer, and Metastasis*
Invited Speaker, Center for Integrative Genomics, University of Lausanne, Lausanne, Switzerland.

2010 *Endothelial Epoxyeicosatrienoic Acids Stimulate Cancer and Multi-organ Metastasis*
Invited Speaker, 8th Annual Congress of International Drug Discovery, Science, and Technology, Beijing, China.

2010 *Epoxyeicosatrienoic Acids Control Angiogenesis-dependent Regeneration*
Invited Speaker, 3rd Annual World Congress of Regenerative Medicine and Stem Cells, Shanghai, China.

2012 *Epoxy-eicosanoids Stimulate Multi-organ Metastasis and Tumor Dormancy Escape*
Invited Speaker, 4th International Conference on Drug Discovery & Therapy, Dubai, United Arab Emirates.

2012 *Epoxy-eicosanoids Promote Tissue and Organ Regeneration*
4th international Conference on Drug Discovery & Therapy, Dubai, United Arab Emirates.

2012 *Epoxyeicosatrienoic Acids Regulate Angiogenesis-mediated Tissue Regeneration*
Invited Speaker, 5th Annual World Congress of Regenerative Medicine and Stem Cells, Guangzhou, China.

2013 Invited Speaker, Biopharmaceutical Summit, Frankfurt, Germany.

2014 Invited Speaker, The 18th International Vascular Biology Meeting, Kyoto, Japan.

2014 Invited Speaker, Endothelial Cell Phenotypes in Health and in Disease, Girona, Spain.

2014 Invited Speaker, 2014 Wuhan Symposium on Polyunsaturated Fatty Acid and Metabolism, China

2015 Invited Speaker, 14th International Conference on Bioactive Lipids in Cancer, Inflammation, and Related Diseases, Budapest, Hungary.

2015 Invited Speaker, Visiting Professor, Khon Kaen University, Thailand.

2016 Invited Speaker, 6th European Workshop on Lipid Mediators, Frankfurt Germany.

2017 Invited Speaker, 15th International Conference on Bioactive Lipids in Cancer, Inflammation, and Related Diseases, Puerto Vallarta, Mexico.

2018 Invited Speaker, 1st Workshop on Resolutive Pharmacology for Inflammatory Diseases, Besancon, France

2019 Invited Speaker, Visiting Professor, Khon Kaen University, Thailand.

2019 Invited Speaker, Frankfurt, Germany

2019 Invited Speaker, Foshan, China

2019 Invited Speaker, Xian, China

2019 Invited Speaker, Madrid, Spain

Report of Technological and Other Scientific Innovations

Use of epoxyeicosanoids in tissue regeneration, including organ regeneration, and wound healing	**Panigrahy D,** Kieran MW, inventors; Children's Hospital Boston. Epoxyeicosatrienoic Acids: A Lipid Autacoid that Regulates Tissue Homeostasis, Tumor Growth and Metastasis. US patent 61/300,477. 2010 February 2. We demonstrated the first application of epoxyeicosanoids to stimulate organ regeneration and wound healing.
Use of TNP-470	Rupnick M, **Panigrahy D**, Langer, R, Folkman J, inventors; Children's Hospital Boston. Method for Regulating Size of Vascularized Normal Tissue. US patent 6306819. 2001. This was the first demonstration that angiogenesis inhibitors can regulate obesity.
Targeting the perioperative period, especially the administration of COX-1 selective inhibitors *preoperatively*, may prevent tumor recurrence after surgery or biopsy.	Sukhatme V, **Panigrahy D**. Methods for Reducing Recurrence of Tumors. US Patent 62/419,785. Synthetic COX-1 selective inhibitors should be synthesized and targeted for administration prior to surgery or biopsy to prevent tumor recurrence and tumor dormancy escape. Serhan CN **Panigrahy D**, Proresolving mediators and Cancer Clearance 63,171 BWH 24733 BI 2093 Sukhatme V, Serhan CN, **Panigrahy D**. Prevention of Surgery-Stimulated Tumor Growth and Metastasis by Resolvins;.Attorney Docket No. 13681-0032P01/BIDMC 2092

Report of Scholarship

Publications

Research Investigations

1. **Panigrahy D**, Beecken WC, Boehm T, Keough K, Stewart R, Flynn E,Achilles EA, Folkman J. Antiangiogenic Therapy of Orthotopic Human Prostate Cancer in Mice Guided by Prostate-Specific Antigen. Surgical Forum. 1998.

2. Arbiser JL, **Panigrahy D**, Klauber N, Rupnick M, Flynn E, Udagawa T, D'Amato RJ. The Antiangiogenic Agents TNP-470 and 2-Methoxyestradiol Inhibit the Growth of Angiosarcoma in Mice. Journal of American Academy of Dermatology. 1999; 40:925-929.

3. Hahnfeldt P, **Panigrahy D**, Folkman J, Hlatky L. Tumor Development Under Angiogenic Signaling: A Dynamical Theory of Tumor Growth, Treatment Response, and Postvascular Dormancy. Cancer Research. 1999; 59:4770-4775.

4. Verheul HMW, **Panigrahy D**, D'Amato RJ. Combination Oral Antiangiogenic Therapy with Thalidomide and Sulindac Inhibits Tumour Growth in Rabbits. British Journal of Cancer. 1999; 79:114-118.

5. Verheul HMW, **Panigrahy D**, Flynn E, Pinedo HM, D'Amato RJ. Treatment of the Kasabach-Merritt Syndrome with Pegylated Recombinant Human Megakaryocyte Growth and Development Factor in Mice: Elevate Platelet Counts, Prolonged Survival, and Tumor Growth Inhibition. Pediatric Research. 1999; 46:562-565.

6. Zhao H, Bojanowski K, Ingber DE, **Panigrahy D**, Pepper MS, Montesano R, Shing Y. A New Role for tRNA and its Fragment Purified from Human Urinary Bladder Carcinoma Conditioned Medium: Inhibition of Endothelial Cell Growth. Journal of Cellular Biochemistry.1999; 76:109-117.

7. Lin J, **Panigrahy D**, Trinh LB, Folkman J, Shiloach J. Production Process for Recombinant Human Angiostatin in *Pichia pastoris.* Journal of Industrial Microbiology and Biotechnology. 2000.

8. Udagawa T, Yuan J, **Panigrahy D**, Madsen J, D'Amato RJ. Cytochalasin E, an Epoxide Containing Aspergillus-derived Fungal Metabolite, Inhibits Angiogenesis and Tumor Growth. Journal of Pharmacology and Experimental Therapeutics. 2000; 294:421-427.

9. Beecken WD, Fernandez A, **Panigrahy D**, Achilles EG, Kisker O, Flynn E, Joussen AM, Folkman J, Shing Y. Efficacy of Antiangiogenic Therapy with TNP-470 in Superficial and Invasive Bladder Cancer Models in Mice. Urology. 2000; 56:521-526.

10. Stewart RJ, **Panigrahy D**, Flynn E, Folkman J. Vascular Endothelial Growth Factor Expression and Tumor Angiogenesis are Regulated by Androgens in Hormone Responsive Human Prostate Carcinoma: Evidence for Androgen Dependent Destabilization of Vascular Endothelial Growth Factor Transcripts. The Journal of Urology. 2001; 165:688-693.

11. Rupnick MA, **Panigrahy D**, Zhang CY, Lowell BB, Langer R, Folkman J. Adipose Tissue Mass: Can be Regulated Through the Vasculature. Proceedings of the National Academy of Sciences. 2002;99(16): 10730-10735. (cover)

12. **Panigrahy D**, Singer S, Shen LQ, Butterfield CE, Freedman DA, Moses MA, Kilroy S, Duensing S, Fletcher C, Fletcher JA, Hlatky L, Hahnfeldt P, Folkman J, Kaipainen A. PPARγ Ligands Inhibit Primary Tumor Growth and Metastasis by Inhibiting Angiogenesis. Journal of Clinical Investigation. 2002;110(7):923-932. (cover)

13. Duensing A, Medeiros F, McConarty B, Joseph NE, **Panigrahy D**, Singer S, Fletcher CD, Demetri GD, Fletcher JA. Mechanisms of Oncogenic KIT Signal Transduction in Primary

Gastrointestinal Stromal Tumors (GISTs). Oncogene. 2004;23(22)3999-4006.

14. Hida, K, Hida Y, Amin DN, Flint A, **Panigrahy D**, Morton CC, Klagsbrun M. Tumor-Associated Endothelial Cells with Cytogenetics Abnormalities. Cancer Research. 2004;64(22):8249-8255. (cover)

15. Kaipainen A, Kieran MW, Huang S, Butterfield C, Bielenberg D, Mostoslavsky G, Mulligan R, Folkman, J, **Panigrahy D***. PPARα Deficiency in Inflammatory Cells Suppresses Tumor Growth. PLoS ONE. 2007; 2(2): e260 1-11.

16. **Panigrahy D***, Kaipainen A, Huang S, Butterfield C, Barnes CM, Fannon M, Laforme AM, Chaponis DM, Folkman J, Kieran MW. The PPARα Agonist Fenofibrate Suppresses Tumor Growth Through Direct and Indirect Angiogenesis Inhibition. Proceedings of the National Academy of Sciences. 2008 105(3) 985-990.

17. Fannon M, Forsten-Williams K, Nugent MA, Gregory KJ, Chu CL, Goerges-Wildt AL, **Panigrahy D**, Kaipainen A, Barnes C, Lapp C, Shing Y. Sucrose Octasulfate Regulates Fibroblast Growth Factor-2 Binding, Transport, and Activity: Potential for Regulation of Tumor Growth. Journal of Cell Physiology. 2008 215(2):434-441.

18. **Panigrahy D**, Kaipainen A, Butterfield C, Chaponis DM, Laforme AM, Folkman J, Kieran MW. Inhibition of Tumor Angiogenesis by Oral Etoposide. Experimental and Therapeutic Medicine. 2010 1(5):739-746.

19. Benny O, Nakai K, Yoshimura T, Bazinet L, Akula JD, Nakao S, Hafezi-Moghadam A, **Panigrahy D**, Pakneshan P, D'Amato RJ. Broad Spectrum Antiangiogenic Treatment Regresses Ocular Neovascular Diseases in Mice. PloS ONE. 2010 1:5(9) pii: e12515.

20. Fernandez CA, Roy R, Lee S, Yang J, **Panigrahy D**, Van Vliet KJ, Moses MA. The Anti-angiogenic Peptide, Loop 6, Binds IGF-IR. Journal of Biological Chemistry. 285(53);41886-95. 2010 December 31.

21. Chaponis D, Barnes J, Dellagatta JL, Kesari S, Fast E, Sauvageot C, **Panigrahy D**, Ramakrishna N, Wen PY, Kung AL, Stiles C, Kieran MW. Lonafarnib (SCH66336) Improves the Activity of Temozolomide and Radiation for Orthotopic Maligant Gliomas. Journal of Neuro-Oncology. 2011 Aug; 104(1); 179-189.

22. **Panigrahy D***, Edin ML, Lee CR, Huang S, Bielenberg DR, Butterfield CE, Barnés CM, Mammoto A, Mammoto T, Luria A, Benny O, Chaponis DM, Dudley AC, Greene ER, Vergilio J, Pietramaggiori G, Scherer-Pietramaggiori SS, Short SM, Seth M, Lih FB, Tomer KB, Yang J, Schwendener RA, Hammock BD, Falck JR, Manthati VL, Ingber DE, Kaipainen A, D'Amore PA, Kieran MW, Zeldin DC. Epoxy-eicosanoids stimulate multi-organ metastasis and tumor dormancy escape in mice. The Journal of Clinical Investigation 2012, 122(1):178-191. PMID:22182838 (Featured with related commentary in The Journal of Clinical Investigation: Wang D, Dubois RN. Epoxyeicosatrienoic acids: a double-edged sword in cardiovascular diseases and cancer 2012, 122(1):19-22. Voted by Faculty of 1000 as one of the top 2% of publications in biology and medicine.)

23. Barnés CM, Prox D, Christison-Lagay EA, Le HD, Short S, Cassiola F, **Panigrahy D**, Chaponis D, Butterfield C, Nehra D, Fallon EM, Kieran M, Folkman J, Puder M. Inhibition of neuroblastoma cell proliferation with omega-3 fatty acids and treatment of a murine model of human neuroblastoma using a diet enriched with omega-3 fatty acids in combination with sunitinib.

Pediatr Res. 2012 Feb;71(2):168-78. doi: 10.1038/pr.2011.28. Epub 2011 Dec 21. PMID:22258128

24. Stahl A, Joyal JS Chen J, Sapieha P, Juan AM, Hatton CJ, Pei DT, Hurst CG, Seaward MR, Krah NM, Dennison RJ, Greene ER, Boscolo E, **Panigrahy D#**, Smith LE. SOCS3 is an endogenous inhibitor of pathologic angiogenesis. Blood. 2012 Jul 12. [Epub ahead of print]

25. Zhang G, **Panigrahy D**, Mahakian L, Yang J, Liu J, Lee K, Wettersten H, Ulu A, Hu X, Tam S, Hwang S, Ingham E, Kieran MW, Weiss RH, Ferrara KW, and Hammock BD. Epoxy metabolites of docosahexaenoic acid (DHA) inhibit angiogenesis, tumor growth, and metastasis. Proceedings of the National Academy of Sciences. 2013, Apr 16;110(16):6530-5.

26. Dearling JL. Barnes JW, **Panigrahy D**, Zimmerman RE, Fahey F, Treves ST, Morrison MS, Kieran MW, Packard AB. Specific uptake of 99mTc-NC100692, an αvβ3-targeted imaging probe, in subcutaneous and orthotopic tumors. Nucle Med Biol. 2013 Aug 40(6):788-94.

27. Mammoto T, Jiang A, Jiang E, **Panigrahy D**, Kieran MW, and Mammoto A. A Role of Collagen Matrix in Tumor Angiogenesis and Glioblastoma Multiforme Progression. The American Journal of Pathology. 2013 Oct 183(4):1293-305.

28. **Panigrahy D***, Kalish BT, Huang S, Bielenberg DR, Le HD, Yang J, Edin ML, Lee CR, Benny O, Mudge DK, Butterfield CE, Mammoto A, Mammoto T, Inceoglu B, Jenkins RL, Simpson M, Akino T, Lih FB, Tomer KB, Ingber DE, Hammock BD, Falck JR, Manthati VL, Kaipainen A, Amore PA, Puder M, Zeldin DC, Kieran MW. Epoxyeicosanoids Promote Organ and Tissue Regeneration. Proceedings of the National Academy of Sciences. 2013 Aug 13:110(33):13528-33.

29. Shao Z, Fu Z, Stahl A, Joyal JS, Hatton C, Juan A, Hurst C, Evans L, Cui Z, Pei D, Xu D, Edin ML, Lih F, Sapieha P, Chen J, **Panigrahy D**, Hellstrom A, Zeldin DC, Smith LE. Cytochrome P450 2C8 ω3LCPUFA Metabolites Increase Pathologic Neovascularization in Mouse Oxygen-Induced Retinopathy. Arteriosclerosis, Thrombosis, and Vascular Biology. 2014 Mar;34(3):581-6.

30. Dahlman JE, Barnes C, Khan O, Thiriot A, Jhunjunwala S, Shaw TE, Xing Y, Sager HB, Sahay G, Speciner L, Bader A, Bogorad RL, Yin H, Racie T, Dong Y, Jiang S, Seedorf D, Dave A, Sandu KS, Webber MJ, Novobrantseva T, Ruda VM, Lytton-Jean AK, Levins CG, Kalish B, Mudge DK, Perez M, Abezgauz L, Dutta P, Smith L, Charisse K, Kieran MW, Fitzgerald K, Nahrendorf M, Danino D, Tuder RM, von Andrian UH, Akinc A, **Panigrahy D**, Schroeder A, Kotelianski V, Langer R, Anderson DG. Nat Nanotechnol. 2014 Aug 9(8):648-55.

31. Gus-Brautbar Y, **Panigrahy D**. Time heals all wounds-but 12-HHT is faster. Journal of Experimental Medicine. 2014 June 2, 211 (6): 1008.

32. **Panigrahy D**, Adini I, Mamluk R, Levonyak N, Bruns CJ, D'Amore PA, Klagsbrun M, Bielenberg DR. Regulation of soluble neuropilin 1, an endogenous angiogenesis inhibitor, in liver development and regeneration. Pathology. 2014 Aug; 46(5):416-23.

33. Zhang G, **Panigrahy D****, Hwang SH, Yang J, Mahakian LM, Wettersten HI, Liu JY, Wang Y, Ingham ES, Tam S, Kieran MW, Weiss RH, Ferrara KW, Hammock BD. Dual inhibition of cyclooxygenase-2 and soluble epoxide hydrolase synergistically suppresses primary tumor growth and metastasis. Proceedings of the National Academy of Sciences. 2014 Jul 29111(30):11127-32.

34. Li P, Lahvic JL, Binder V, Pugach EK, Riley EB, Tamplin OJ, **Panigrahy D**, Bowman TV, Heffner GC, McKinney-Freeman S, Schlaeger TM, Daley GQ, Zeldin DC, and Zon LI. Epoxyeicosatrienoic Acids Enhance Haematopoietic Stem and Progenitor Cell Specification and Engraftment. 2015 Nature Jul 22;523(7561):468-71.

35. Shahrabi-Farahani S, Gallottini M, Martins F, Li E, Mudge DR, Nakayama H, Hida K, **Panigrahy D**, D'Amore PA, Bielenberg DR. Neuropilin 1 Receptor Is Up-Regulated in Dysplatic Epitheiul and Oral Squamous Cell Carcinoma. Am J Pathol. 2016 Apr;186(4):1055-64.

36. Wepler M, Beloiartsev A, Buswell MD, **Panigrahy D**, Malhotra R, Buys ES, Radermacher P, Ichinose F, Bloch DB, Zapol WM. Soluble epoxide hydrolase deficiency or inhibition enhances murine hypoxic pulmonary vasoconstriction after lipopolysaccharide challenge. Am J Physiol Lung Cell Mol Physiol. 2016 Dec 1;311(6):L1213-L1221

37. Rand AA, Barnych B, Morisseau C, Cajka T, Lee KSS, **Panigrahy D**, Hammock BD. Cyclooxygenase-derived proangiogenic metabolites of epoxyeicosatrienoic acids. Proc Natl Acad Sci U S A. 2017 Apr 25;114(17):4370-4375

38. Lee HY, Parkinson EI, Granchi C, Paterni I, **Panigrahy D**, Seth P, Minutolo F, Hergenrother PJ. Reactive Oxygen Species Syngergize to Potently and Selectively Induce Cancer Cell Death. ACS Chem Biol. 2017 May 19;12(5):1416-1424.

39. Sulciner, ML, Serhan CN, Gilligan MM, Mudge DK, Chang J, Gartung A, Lehner KA, Bielenberg DR, Schmidt B, Dalli J, Greene ER, Gus-Brautbar Y, Piwowarski J, Mammoto T, Zurakoski D, Peretti M, Sukhatme VP, Kaipainen A, Kieran MW, Huang S, **Panigrahy D**. Resolvins suppress tumor growth and enhance cancer therapy. *Journal of Experimental Medicine* 2018 Jan 2;215(1):115-140. Featured with related Insight commentary in *Journal of Experimental Medicine*: Bonavita E, Pelly PS, Zelenay S. Resolving the dark side of therapy-driven cancer cell death Dec 2017, DOI:10.1084/jem.20172044. Voted by Faculty of 1000 as one of the top 2% of publications in biology and medicine. Featured in Science, EurekAlert, Genetic Engineering & Biotechnology News, ecancernews, Medical News, MedIndia, Newswise, ALN Magazine, Stat News, Health Medicine Network, Science Newsline, Medical News Today, El Economista, BioCentury, MedPage Today and Boston Globe.

40. Yang H, Wang W, Romano KA, Gu M, Sanidad KZ, Kim D, Yang J, Schmidt B, **Panigrahy D**, Pei R, Martin DA, Ozay EI, Wang Y, Song M, Bolling BW, Xiao H, Minter LM, Yang G-Y, Liu Z, Rey FE, Zhang G. Common antimicrobrial additive increases colonic inflammation and colitis-ssociated colon tumorigenesis in mice. *Science Translational Medicine* 20110(443). pii: eaan4116. doi: 10.1126.

41. Chang J, Bhasin SS, Bielenberg DR, Sukhatme VP, Bhasin M, Huang S, Kieran MW, **Panigrahy D***. Chemotherapy-generated cell debris stimulates colon carcinoma tumor growth via osteopontin. *The FASEB Journal 2019 33(1):114-125.* *Corresponding Author

42. Gartung A, Yang J, Sukhatme VP, Bielenberg DR, Fernandes D, Chang J, Schmidt BA, Hwang SH, Zurakowski D, Huang S, Kieran MW, Hammock BD, and **Panigrahy D***. Suppression of chemotherapy-induced cytokine/lipid mediator surge and ovarian cancer by a dual COX2-sEH inhibitor. *Proceedings of the National Academy of Sciences* 2019; 116(5):1698-1703.

43. Gilligan MM, Gartung A, Sulciner ML, Norris PC, Sukhatme VP, Bielenberg DR, Huang S, Kieran MW, Serhan CN, **Panigrahy D***. Aspirin-Triggered Pro-resolving Mediators Stimulate Resolution in Cancer. *Proceedings of the National Academy of Sciences* 2019. 116(13):6292-

…….. 6297.

44. **Panigrahy D***, Panigrahy D, Gartung A, Yang J, Yang H, Gilligan MM, Sulciner ML, Bhasin SS, Bielenberg DR, Chang J, Schmidt BA, Piwowarski J, Fishbein A, Soler-Ferran D, Sparks MA, Staffa SJ, Sukhatme V, Hammock BD, Kieran MW, Huang S, Bhasin M, Serhan CN, Sukhatme VP (2019). Pre-operative stimulation of resolution and inflammation blockade eradicates micrometastases. *The Journal of Clinical Investigation*. 2019.129(7):2964-2979. (Editor's pick- July). Featured with related commentary in *The Journal of Clinical Investigation: Dampening the fire to prevent surgery- and chemotherapy-induced metastasis, and Research Watch in Cancer Discovery*

45…….. Fishbein A, Wang W, Yang H, Yang J, Hallisey VM, Deng J, Verheul S.M.L., Hwang S.H., Gartung A, Wang Y, Bielenberg DR, Huang S, Kieran MW, Hammock BD, **Panigrahy D***. . Resolution of eicosanoid/cytokine storm prevents carcinogen and inflammation-initiated hepatocellular cancer progression. *Proceedings of the National Academy of Sciences* 2020 (in press).

#co-senior author
**co-first author
*corresponding author

Other Peer Reviewed Publications

1. **Panigrahy D**, Shen LQ, Kieran MW, Kaipainen A. Therapeutic Potential of Thiazolidinediones as Anticancer Agents. Expert Opinion on Investigational Drugs. 2003 12(12):1925-1937.

2. **Panigrahy D***, Huang S, Kieran MW, and Kaipainen A. PPARγ as a Therapeutic Target for Tumor Angiogenesis and Metastasis. Cancer Biology and Therapy. 2005; 4(7):96-102.

3. **Panigrahy D***, Kaipainen A, Kieran MW, Huang S. PPARs: A Double Edged Sword in Cancer Therapy? PPAR Research. 2008: 350351.

4. Robbins ME, Linard C, **Panigrahy D**. PPARs and Anticancer Therapies. PPAR Research. 2010: 536415.

5. **Panigrahy D***, Kaipainen A, Greene ER, Huang, S. Cytochrome P450-derived Eicosanoids: the Neglected Pathway in Cancer. Cancer and Metastasis Reviews. 2010, December 29(4):723-35. (cover)

6. Greene ER, Huang S, Serhan CN, **Panigrahy D***. Regulation of Inflammation in Cancer by Eicosanoids. Prostaglandins Other Lipid Mediat. 2011 Nov; 96(1-4);27-36.

7. **Panigrahy D***, Greene ER, Pozzi A, Wang DW, Zeldin DC. EET signaling in cancer. Cancer and

Metastasis Reviews. 2011 Dec; 30(3-4);525-540.

8. Kalish BT, Kieran MW, Puder M, **Panigrahy D**. The growing role of eicosanoids in tissue regeneration, repair, and wound healing. Prostaglandins Other Lipid Mediat. 2013 Aug. 104-105:130-8.

9. Wang W, Zhu J, Lyu F, **Panigrahy D**, Ferrara KW, Hammock B, Zhang G. ω-3 Polyunsaturated fatty acids-derived lipid metabolites on angiogenesis, inflammation and cancer. Prostaglandins Other Lipid Mediat. 2014 July 11.

10. **Panigrahy D**, Hammock B. Editorial: 15th International Winter Eicosanoid Conference. Prostaglandins Other Lipid Mediat. 2014 Oct, 113-115:1.

11. **Panigrahy D**, Zeldin DC. WEC 2016 special issue Editorial: 16th International Winter Eicosanoid Conference. Prostaglandins Other Lipid Mediat. 2017. 132:1-2.

12. Gartung A, **Panigrahy D.** Preface. Cancer Metastasis Rev. 2018. 37(2-3):201-202.

13. Sulciner ML, Gartung A, Gilligan MM, Serhan CN, **Panigrahy D.** Targeting lipid mediators in cancer biology. Cancer Metastasis Rev. 2018. 37(2-3):557-572.

14. Serhan K, Gartung A, **Panigrahy D.** Drawing a link between the thromboxane A2 pathway and the role of platelets and tumor cells in ovarian cancer. Prostaglandins Other Lipid Mediat. 2018. 137:40-45.

15. **Panigrahy D,** Gilligan MM**.** Preface. Cancer Metastasis Rev. 2019. 38(4):551-552.

16. **Panigrahy D**, Gilligan MM, Huang S, Gartung A, Cortés-Puch I, Sime PJ, Phipps RP, Serhan CN, Hammock BD. Inflammation Resolution: a dual-pronged approach to averting cytokine storms in COVID-19. Cancer Metastasis Rev. 2020. 39(2):337-340 (downloaded over 13,000 times in first 2 months).

17. **Panigrahy D,** Gilligan MM**.** Preface. Cancer Metastasis Rev. 2020. 39(1):1-2.

18. Hammock BD, Wang W, Gilligan MM, **Panigrahy D.** Eicosanoids: The Overlooked Storm in Coronavirus Disease 2019 (COVID-19). Am J Pathol 2020. Jul 8. S0002-9440(20)30332-1.

19. Fishbein A, Hammock BD, Serhan CN, **Panigrahy D.** Carcinogenesis: Failure of Resolution of Inflammation? Pharmacology & Therapeutics 2020 (in press).

Book Chapters

1. Sulciner ML, Gilligan MM, Zetter BR, **Panigrahy D**. Inflammation and Cancer: The Role of Lipid Signaling in the Continuum Between Two Ends of the Tumor Spectrum. Biomarkers of the Tumor Microenvironment (Springer 2017)

Abstracts, Poster Presentations and Exhibits Presented at Professional Meetings

1. Kalish B, Kieran MW, Le H, Zeldin DC, Kalish B, de Meijer VE, Edin ML, Lee CR, Vergilio J, Hammock BD, Puder M, **Panigrahy D**. Endothelial-derived Epoxyeicosatrienoic Acids Promote Liver Regeneration. 70th Annual Soma Weiss Medical and Dental Student Research Day. January 14, 2010. Boston, Massachusetts.

2. Le H, Kieran MW, Zeldin DC, Kalish B, de Meijer VE, Edin ML, Lee CR, Vergilio J, Hammock BD, Puder M, **Panigrahy D**. Endothelial-derived EETs Promote Organ Regeneration. 17th Annual Surgical Resident and Fellow Research Presentation Day, New England Surgery Society. May 14, 2010 Boston, Massachusetts. (abstract awarded 2nd Place – Basic Science Category).

3. Le H, Kieran MW, Zeldin DC, Kalish B, de Meijer VE, Edin ML, Lee CR, Vergilio J, Hammock BD, Puder M, **Panigrahy D**. Endothelial-derived Epoxyeicosatrienoic Acids Promote Lung Regeneration. American Pediatric Surgical Association 41st Annual meeting. May 16-19, 2010. Orlando, Florida.

4. Greene ER, Benny O, Butterfield C, Kieran MW, Huang S, Serhan CN, **Panigrahy D**. Resolvins: A novel class of lipid mediators which inhibit primary tumor growth and metastasis by inhibiting inflammation. 13th Winter Eicosanoid Conference. March 13-16, 2011. Baltimore, MD (abstract awarded the Prostaglandins and other Lipid Mediators Young Investigator Award).

5. **Panigrahy D**. Cancer Progression: the Failure to Resolve? 12th International Conference on Bioactive Lipids in Cancer, Inflammation, and Related Diseases, Seattle, Washington. September 18-21, 2011.

6. Greene ER, Kieran MW, Benny O, Butterfield C, Bielenberg DR, Fredman G, Vickery T, Vergilio JA, Huang S, Serhan CN, **Panigrahy D**. Resolvins: A novel class of lipid mediators which inhibit primary tumor growth and metastasis through inflammation. 12th International Conference on Bioactive Lipids in Cancer, Inflammation and Related Diseases, Seattle, Washington. September 18-21, 2011 (Santosh Nigam Memorial Outstanding Young Scientist Award Contestant).

7. Kalish BT, Kieran MW, Le HD, Bielenberg DR, Lee, CR Edin ML, Greene ER, Vergilio JA, Hammock BD, Falck JR, Puder M, Zeldin DC, **Panigrahy D**. Epoxyeicosatrienoic acids promote organ regeneration. 14th International Winter Eicosanoid Conference. March 11-14, 2012. Baltimore, MD (abstract awarded the Prostaglandins and other Lipid Mediators Young Investigator Award).

8. **Panigrahy D**. Resolvins in Cancer: Resolution as the Solution. Pediatric hematology/Oncology Retreat. Endicott House, Cambridge, Massachusetts. October 3, 2012.

9. Casper JA, Bielenberg DR, Cheng J, Greene ER, Hammock BD, Zeldin DC, Kieran MW, **Panigrahy D**. Control of pancreatic cancer and metastasis by cytochrome P450-derived eicosanoids. 9th AACR-Japanese Cancer Association Joint Conference: Breakthroughs in Basic and Translational Cancer Research. February 21-25, 2013. Maui, Hawaii.

10. Serhan K, Mudge DK, Bielenberg DR, Greene ER, Hwang SH, Hammock BD, Kieran MW, **Panigrahy D**. Epoxyeicosanoid regulation of tumor lymphangiogenesis. 9th AACR-Japanese Cancer Association Joint Conference: Breakthroughs in Basic and Translational Cancer Research. February 21-25, 2013. Maui, Hawaii.

11. Casper JA, Bielenberg DR, Cheng J, Schmidt B, Hammock BD, Zeldin DC, Kieran MW, **Panigrahy D**. Cytochrome P450-derived eicosanoids regulate pancreatic cancer and metastasis. AACR Annual Meeting April 6-10, 2013. Washington DC.

12. Mudge DK, Serhan K, ,Bielenberg DR, Hwang SH, Hammock BD, Kieran MW, **Panigrahy D**. Control of tumor lymphangiogenesis by epoxyeicosanoids. AACR Annual Meeting April 6-10, 2013. Washington DC (abstract awarded the AACR-Bristol-Myers Squibb Oncology Scholar-in-Training Award).

13. Mudge DK**,** Bielenberg D, Serhan K, Hwang SH, Hammock B, Kieran MW, **Panigrahy D**. Control of tumor lymphangiogenesis by epoxyeicosanoids. 9th Annual Symposium in Cellular, Molecular and Clinical Research in Surgery, Boston, MA, March 6, 2013 (abstract awarded the Best Poster Award).

14. Mudge DK, Kieran MK, Greene ER, Bielenberg D, Benny O, Huang S, Serhan CN, **Panigrahy D**. Cancer Progression: the Failure to Resolve?. 14th Annual Judah Folkman Research Day, Boston Children's Hospital, Boston, MA, May 15, 2013 (abstract awarded the Judah Folkman Research Day Award).

15. Casper JA, Bielenberg DR, Cheng J, Schmidt B, Hammock BD, Zeldin DC, Kieran MW, **Panigrahy D**. Cytochrome P450-derived eicosanoids regulate pancreatic cancer and metastasis. 9th Annual Center for Vascular Biology Research Retreat, Beth Israel Deaconess Medical Center. Falmouth, Cape Cod, MA, June 17-18, 2013 (abstract awarded the Best Abstract Award).

Narrative Report (limit to 500 words)

I was accepted into medical school while in high school. I trained in surgery with Dr. Roger Jenkins, who performed the first liver transplant in Boston. Over the past decades, I have led angiogenesis and cancer animal modeling in the Folkman laboratory (where many of these models were pioneered).

Major Research Contributions: I have a longstanding interest in eicosanoids in cancer, focusing on the tumor stroma including angiogenesis and inflammation. I was fortunate enough to be mentored by one of the leading scientists in this field, Dr. Judah Folkman. I demonstrated the endothelium and certain stromal cells secrete EETs, and that these lipid autacoids stimulate multi-organ metastasis and escape from tumor dormancy. Based on this discovery, I was awarded my first RO1 funding to study EETs in cancer and metastasis (Panigrahy *et al. JCI* 2012, 122(1):178-191, cited by Faculty of 1000 as one of the top 2% of publications in biology and medicine). As part of the NCI's Provocative Questions project, I was awarded my second RO1 to study endogenous anti-inflammatory lipid autacoids such as resolvins and their role in inflammation resolution in cancer. I am also funded by industry (e.g. Inception Sciences) to study eicosanoid modulating drugs in experimental cancer models. I continue to play an active role in bringing together the fields of bioactive lipids and vascular biology through the organization of meetings and leading various bioactive lipid meetings.

Our laboratory's 5 publications over the past year in various high-impact journals are a testament to our laboratory leading the field of resolution of inflammation in cancer. Our publications include the following: **(1)** Sulciner *et a*l 2018 Resolvins suppress tumor growth and enhance cancer therapy *Journal of Experimental Medicine.* 215:115-140. Featured with related Insight commentary in *Journal of Experimental Medicine*: Resolving the dark side of therapy-driven cancer cell death. Voted by Faculty of 1000 as one of the top 2% of publications in biology and medicine. Featured in Science, EurekAlert, Genetic Engineering & Biotechnology News, ecancernews, Medical News, MedIndia, Newswise, ALN Magazine, Stat News, Health Medicine Network, Science Newsline, Medical News Today, El Economista, BioCentury, MedPage Today, and Boston Globe; **(2)** Gartung A *et al* 2019. Suppression of chemotherapy-induced cytokine/lipid mediator surge and ovarian cancer by a dual COX-2/sEH inhibitor. *Proceedings of the National Academy of Sciences*. 116:1698-1703. Featured in Medical Xpress, EurekAlert, Entomolology & Nematology UC News, Bug Squad Blog, and The California Aggie; **(3)** Gilligan *et al* 2019. Aspirin-triggered pro-resolving mediators stimulate resolution in cancer. *Proceedings of the National Academy of Sciences*. 116; 6292-6297. Featured in *Harvard Medical School News & Research*: Mitchell J, A daily dose; **(4)** Panigrahy et al 2019. Pre-operative stimulation of resolution and inflammation blockade eradicates micrometastases. *The Journal of Clinical Investigation*. June 17:130; 2974-2979; Featured with Editor's pick in July. Featured with related commentary in *The Journal of Clinical Investigation: Dampening the fire to prevent surgery- and chemotherapy-induced metastasis, and Research Watch in Cancer Discovery* and **(5)** Chang et al. Chemotherapy-generated cell debris stimulates colon carcinoma tumor growth via osteopontin. *The FASEB Journal* 2019 33(1):114-125.

Our studies on the stimulation of resolution of inflammation in cancer are highly innovative and represent a paradigm shift as a novel approach to the treatment of therapy-stimulated cancer with biological and clinical importance. Over the past year, we showed that resolvins - compounds naturally produced in our body to stop the inflammatory response - can stop tumors from growing when such growth is stimulated by cellular debris generated by surgery or chemotherapy. Our studies show that traditional cancer therapy may be a 'double-edged sword', wherein the very treatment used to cure cancer is also helping it survive and grow. Overcoming the dilemma of debris-induced tumor progression is paramount if we are to prevent tumor recurrence of treatment-resistant tumors, which is the major reason for cancer therapy failure. The treatment with resolvins inhibited debris-stimulated tumor growth and blocked the cancer cells from spreading. Additionally, resolvins boosted the activity of various anti-cancer therapies, making them more effective in their fight against tumors. Enhancing the resolvin pathways provides an entirely new, non-toxic, and non-immunosuppressive approach to cancer therapy. Resolvins are currently in clinical trials for other chronic inflammatory diseases and we are aiming to translate them to cancer patients, including children with brain tumors. Inflammation induced by front-line cancer therapies,

including surgical resection, chemotherapy, and radiation, can paradoxically promote cancer progression by impairing anti-tumor immunity. We explored the hypothesis that limiting inflammation or accelerating its resolution in combination with other anti-cancer approaches can prevent therapy-stimulated tumor progression and metastasis. Using metastasis-prone murine models of lung and breast cancer, we showed that pre-operative treatment with the NSAID ketorolac substantially reduced surgically-stimulated micrometastases by inhibiting platelet aggregation. Ketorolac's effects were enhanced by immunotherapy and mitigated by adjuvant chemotherapy. Moreover, combined pretreatment with ketorolac and resolvins synergized to prevent both surgery- and chemotherapy-stimulated metastasis and tumor recurrence. These findings support further investigation of inflammation-limiting and pro-resolving strategies to block the adverse effects of standard cancer approaches.

Major Teaching Contributions: Over the past decade I have had the opportunity to both teach and mentor medical students, graduate students and post-doctoral fellows. My training as a surgical resident has been a critical component in the methodology I implemented, such as parabiosis, the unique surgical model of joining the vascular systems of two animals of varying genetic phenotypes. The novelty of our studies is demonstrated my trainess have been awarded 45 Awards since 2011.

Direction for the Future: I am committed to establishing myself as one of the international leaders in understanding the role of lipid autacoids in cancer and other inflammation-associated diseases. My future plans will be to continue to focus on the mechanism of resolvins and related lipid autacoids in development and disease focusing on cancer. This work is ideally suited for translation into the clinic.